STEAM IRON

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to steam irons and, more particularly, to such a steam iron, which prevents reverse flow of steam to the water tank through the water supply pipe of the water tank, and automatically discharges steam when the internal pressure of the boiler is excessively high.

2. Description of the Related Art

A regular steam iron generally comprises a housing, a water tank, and a boiler. The water tank is mounted in the housing and adapted to supply water to the boiler through a water supply pipe. The boiler is adapted to boil water into steam. This structure of steam iron is still not satisfactory in function. When the internal pressure of the boiler is excessively high, hot water (steam) will reversely pass through the water supply pipe to the water tank, increasing the internal pressure of the water tank and stopping the supply of water from the water tank to the boiler. The boiler may keep burning when dried. Burning dry may cause the boiler to burn out or to break the circuit.

SUMMARY OF THE INVENTION

It is therefore the main objective of the present invention to provide a steam iron, which prevents reverse flow of steam from the boiler to the water tank through the water supply pipe of the water tank.

It is another objective of the present invention to provide a steam iron, which automatically discharges steam from the boiler when the internal pressure of the boiler surpassed a predetermined level.

To achieve the above-mentioned objectives, the steam iron provided by the present invention comprises a housing having a receiving chamber therein, a water tank mounted in the receiving chamber and having a tank body for storing water and a water supply pipe extended from the tank body, a boiler mounted in said receiving chamber and having a boiler body connected to the water supply pipe for receiving water from the tank body and boiling water into steam and a relief pipe having an end connected to the boiler body and an opposite end connected to the tank body, a one-way check valve and a relief valve. The one-way check valve has a casing mounted in the water supply pipe and a valve flap movable in the casing of the one-way check valve between an open position and a close position. The valve flap is moved to the open position for enabling cold water to pass from the tank body to the boiler body when an internal pressure of the boiler body is within a predetermined level. The valve flap is moved to the close position by the internal pressure of the boiler body when the internal pressure of the boiler body surpassed the predetermined level. The relief valve has a casing mounted in the relief pipe and a piston mounted in the casing of the relief valve and movable between an open position and a close position to control passage of the relief pipe. The piston is moved to the open position for enabling steam to pass from the boiler body to the tank body when the internal pressure of the boiler body surpassed the predetermined level. The piston is moved to the close position by water from the tank body to stop the passage of the relief pipe when the internal pressure of the boiler body is below the predetermined level.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic drawing of a steam iron according to the present invention.

FIG. 2 is a perspective view of a one-way check valve for the steam iron

according to the present invention.

FIG. 3 is an exploded, partially sectional view of the one-way check valve shown in FIG. 2.

FIG. 4 is an exploded, partially sectional view of a relief valve for the steam iron according to the present invention.

FIG. 5 is a schematic sectional view showing the open status of the one-way check valve according to the present invention.

FIG. 6 is a schematic sectional view showing the close status of the one-way check valve according to the present invention.

FIG. 7 is a schematic sectional view showing the close status of the relief valve according to the present invention.

FIG. 8 is a schematic sectional view showing the open status of the relief valve according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1~8, a steam iron **100** in accordance with a preferred embodiment of the present invention is shown comprising a housing **10**, a water tank **20**, a boiler **30**, a one-way check valve **40**, and a high-pressure relief valve **50**.

The housing **10** defines therein a receiving chamber **11**, which accommodates the water tank **20**, the boiler **30**, the one-way check valve **40**, and the relief valve **50**.

The water tank **20** comprises a tank body **21** fixedly mounted inside the receiving chamber **11** of the housing **10** at one side, and a water supply tube **22** extended from the bottom side of the tank body **21** to the boiler **30**.

The boiler **30** comprises a boiler body **31** and a relief pipe **32**. The boiler body **31** is mounted inside the receiving chamber **11** of the housing **10** and connected

to one end of the water supply tube **22** for receiving water from the water tank **20**. The boiler **30** uses externally supplied electric energy to heat water into steam. The relief pipe **32** has one end connected to the boiler body **31**, and the other end connected to the tank body **21**.

The one-way check valve **40** is mounted in the water supply pipe **22** of the water tank **20** on the middle to guide water from the tank body **21** to the boiler **30**, and to prevent reverse flow of water from the boiler **30** to the tank body **21**. The one-way check valve **40** comprises a casing **41**, a flow guide **42**, and a valve flap **43**. The casing **41** is a tubular member, comprising a water inlet **411** disposed at one end, a flow guide hole **413** disposed at the other end, and an actuation chamber **412** axially connected between the water inlet **411** and the flow guide hole **413**. The water inlet **411** extends axially inwardly from one end of the casing **41** to a predetermined distance. The flow guide hole **413** extends axially inwardly from the other end of the casing **41** to a predetermined distance. The actuation chamber **412** is in fluid communication between the water inlet **411** and the flow guide hole **413**. The actuation chamber **412** has an inner diameter greater than the water inlet **411** but smaller than the flow guide hole **413**. The flow guide **42** is a tubular member having an outer diameter equal to the inner diameter of the flow guide hole **413**. The two distal ends of the flow guide **42** are open ends. A grille **421** is provided at one end of the flow guide **42**. The flow guide **42** is fitted into the flow guide hole **413** of the casing **41**, keeping the grille **421** stopped at the stepped connection area between the actuation chamber **412** and the flow guide hole **413**. The valve flap **43** is a disk-like member having a flap body **431** and a plurality of protruding stop portion **432** radially extended from the periphery of the valve flap body **431** and spaced from one another at distance. The diameter of the valve flap body **431** is greater than the water inlet **411**. The valve flap **43** is mounted in

actuation chamber **412**, keeping the outer ends of the protruding stop portion **432** disposed in lightly contact with the peripheral wall of the actuation chamber **412**.

The relief valve **50** is mounted in the relief pipe **32** of the boiler **30** on the middle, and adapted to release excessive high steam pressure from the boiler body **31**. The relief valve **50** comprises a casing **51**, and a piston **52**. The casing **51** is a tubular member directly mounted in the relief pipe **32** on the middle, comprising a transversely extended stop wall **511**, a center through hole **512** cut through the center of the stop wall **511**, and a plurality of relief holes **513** cut through the stop wall **511** around the center through hole **512**. The piston **52** is molded from elastic material, for example, rubber, comprising a piston rod **522** inserted through the center through hole **512** of the stop wall **511** of the casing **51**, a piston head **521** provided at one end of the piston rod **522** and disposed at one side relative to the stop wall **511**, and a stop flange **523** extended around the periphery of the piston rod **522** and disposed at the other side relative to the stop wall **511**. The piston head **521** has a flat sealing face **524** adapted to seal the center through hole **512** and the relief holes **513**, i.e., the area of the sealing face **524** of the piston head **521** is greater than the area covering the center through hole **512** and the relief holes **513**. The outer diameter of the stop flange **523** is greater than the diameter of the center through hole **512**.

After description of the parts of the steam iron **100** and their assembly procedure, the operation of the steam iron **100** is outlined hereinafter.

When the tank body **21** of the water tank **20** started to supply cold water **W** to the boiler body **31** of the boiler **30**, cold water **W** is guided by the water supply pipe **22** to the one-way check valve **40** to push the valve flap **43** away from the water inlet **411** to the grille **421** of the flow guide **42** and then to flow through the open spaces in the grille **421** to the inside of the flow guide **42** (see FIG. 5) and then to the inside of

the boiler body **31** for boiling into steam. When the internal pressure of the boiler body **31** surpassed a predetermined value, steam **P** will flow back to the inside of the water supply pipe **22** to push the valve flap **43** away from the grille **421** toward the water inlet **411**, thereby causing the valve flap **43** to seal the water inlet **411**, and therefore steam **P** is prohibited from returning to the tank body **21** through the water supply pipe **22** (see FIG. 6). At this time, steam **P** will flow to the relief pipe **32** to push the piston head **521** of the piston **52** away from the stop wall **511** and then to flow through the relief holes **513** to the inside of the tank body **21** (see FIG. 8), enabling the internal pressure of the boiler body **31** to be released.

Further, because steam **P** can be released from the boiler body **31** to the tank body **21** through the relief valve **50**, cold water **W** can be continuously supplied from the tank body **21** to the boiler body **31**, preventing burning of the boiler body **31**.

If the steam pressure of the boiler body **31** is normal, the piston head **521** will be forced by cold water **W** from the container body **21** to the stop wall **511**, causing the sealing face **524** to seal the center through hole **512** and the relief holes **513** (see FIG. 7) to stop cold water **W** from passing to the boiler body **31** through the relief pipe **32**. If the internal pressure of the boiler body **31** is normal, steam pressure is insufficient to push the piston head **521** away from the stop wall **511**, and therefore steam is prohibited from passing through the relief valve **50** to the tank body **21**.

Further, because the relief holes **513** of the casing **51** of the relief valve **50** have a suitable diameter, releasing steam pressure does not cause a big amount of steam to flow to the inside of the tank body **21**.

As indicated above, the steam iron uses a one-way check valve and a relief valve to control the internal pressure of the boiler body within a safety range, for enabling cold water to be continuously supplied to the boiler body to prevent burning

dry.

Although a particular embodiment of the present invention has been shown and described, it will be understood that various modifications and changes could be made thereunto without departing from the spirit and scope of the invention.